National Transportation Safety Board
Washington, DC 20594

Brief of Accident

Adopted 04/01/2003

DEN02LA103
File No. 12762 | 09/08/2002 | Mead, CO | Aircraft Reg No. N551SA | Time (Local): 09:30 MDT

Make/Model: Adler / SA-1
Engine Make/Model: Rotax / 912WLS
Aircraft Damage: Destroyed
Number of Engines: 1
Operating Certificate(s): None
Type of Flight Operation: Personal
Reg. Flight Conducted Under: Part 91: General Aviation

	Fatal	Serious	Minor/None
Crew	1	0	0
Pass	0	0	0

Last Depart. Point: Broomfield, CO
Destination: Local Flight
Airport Proximity: Off Airport/Airstrip

Condition of Light: Day
Weather Info Src: Weather Observation Facility
Basic Weather: Visual Conditions
Lowest Ceiling: None
Visibility: 10.00 SM
Wind Dir/Speed: 140 / 004 Kts
Temperature (°C): 24
Precip/Obscuration: None / None

Pilot-in-Command Age: 51

Certificate(s)/Rating(s)
Private; Single-engine Land; Gyroplane
Instrument Ratings
None

Flight Time (Hours)

Total All Aircraft: 280
Last 90 Days: 44
Total Make/Model: 44
Total Instrument Time: 3

Witnesses observed "a rotor or a wing" separate from the gyroplane, and the gyroplane then descended and impacted terrain. According to the deputy's report, a rotor blade was found about 150 feet north of the point of impact, and other debris was strewn to the southwest. The co-builder of the accident gyroplane, who was also a close friend of the pilot, contacted three gyroplane experts: the designer of the SA-1 Dominator and President of Rotor Flight Dynamics; a gyroplane aerodynamist; and the designer of another gyroplane. They examined the wreckage and compiled both a factual and analytical report. The following is based on the factual portion of the report. The separated rotor blade was bowed upward and had fractured about 2 feet from the tip. The fracture was consistent with positive overload. There was orange paint and primer transfer marks on the top and upper leading edge (the tail cone was painted orange). The attached rotor blade was also bent upward. The propeller blades exhibited no strike marks. The rotor head and hub bar were intact. The hub bar, normally bent 2.5 degrees upward, was bent approximately 10 degrees upward. The roll pillow blocks bore evidence of hammering and were mushroomed. The pitch stops were similarly damaged. In the analytical portion of the report, the necessity of maintaining blade loading at all times in order to maintain main rotor blade rotation was noted. The fracture on the separated main rotor blade was in "a purely upward bending moment which could only have occurred if the blade rpm had dramatically slowed...If totally unloaded, the blade rpm can deteriorate as fast as 120 rpm/sec." Normal rotor blade rpm is 320 to 400 rpm. If rotor blade rpm were allowed to drop, increasing the velocity of air moving through the rotor system, severe blade "flapping" would result as evidenced by the pounding and mushrooming of the roll pillow blocks and bending of the hub bar on the rotor head. A toxicological test revealed 2.024 (ug/mL, ug/g) paroxetine in the blood and liver. The drug is an antidepressant and contraindicated for flight. The pilot's personal physician prescribed the drug for the treatment of fibromyalgia, a condition manifested by muscle soreness. Adverse effects of the drug include drowsiness, muscle weakness, agitation, and tremors.

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Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: MANEUVERING

Findings
1. (C) ROTOR RPM - NOT MAINTAINED - PILOT IN COMMAND
2. USE OF INAPPROPRIATE MEDICATION/DRUG - PILOT IN COMMAND
3. (C) ROTOR SYSTEM,MAIN ROTOR - OSCILLATION

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
4. TERRAIN CONDITION - GRASS
5. TERRAIN CONDITION - OPEN FIELD

Findings Legend: (C) = Cause, (F) = Factor

The National Transportation Safety Board determines the probable cause(s) of this accident as follows.
the pilot's failure to maintain main rotor rpm, resulting in blade flapping, subsequent blade contact with the airframe, and loss of control.